

The following is a complete listing of all claims in the application, with an indication of the status of each:

Listing of claims:

- 1 1. (currently amended) A method for making prioritized recommendations to
2 a customer in the process of filling a market basket for purchase on an Internet
3 commerce site, the method comprising the steps of:
4 generating a matrix of training data;
5 ~~considering~~determining preferences based on associative and renewal
6 buying history from the training data; and
7 making a prioritized recommendation of items so as to maximize the
8 likelihood that the customer will add to the market basket those items with
9 higher priorities.
- 1 2. (original) The method of claim 1, wherein the two preferences are
2 estimated separately from the training data and combined in proper
3 proportions to obtain an overall preference for item not yet in the market
4 basket.
- 1 3. (canceled) A method for making prioritized recommendations to a
2 customer in the process of filling a market basket for purchase on an Internet
3 commerce site, the method comprising the steps of:
4 collecting statistics from training data;
5 precomputing model parameters from the collected statistics; and
6 recommending ordering for a given partial market basket based on the
7 precomputed model parameters.
- 1 4. (canceled) The method of claim 3, wherein the step of collecting statistics
2 comprises the steps of:

- 3 (a) for each item j , obtaining n_j a number of baskets with item j purchased;
4 (b) for each item j , obtaining n_j' a number of baskets with j being a sole
5 item purchased;
6 (c) for each pair of items i and j , obtaining a number of market baskets n_{ji}
7 with items j and i purchased together; and
8 (d) for each pair of items i and j , obtaining a number of market baskets
9 n_{ji}' with items i and j being the only two items purchased.

1 5. (canceled) The method of claim 4, wherein the step of precomputing
2 model parameters comprises the steps of:

3 (a) computing $\mathbf{P}(\text{renewal}) = \frac{\sum_k n_k'}{\sum_k n_k}$;

4 (b) for each item j , computing $\mathbf{P}(j) = \frac{n_j}{\sum_k n_k}$;

5 (c) for each item j , computing $\mathbf{P}(\text{renewal} \mid j) = \frac{n_j'}{n_j} + \mathbf{P}(\text{renewal}) \left(1 - \frac{n_j'}{n_j} \right)$

6 ;

7 (d) for each item j , computing

8 $\mathbf{P}'(j \mid \text{renewal}) = \mathbf{P}(\text{renewal} \mid j) \times \frac{\mathbf{P}(j)}{\mathbf{P}(\text{renewal})}$;

9 (e) for each pair of items i and j with $n_{ij} \neq 0$, computing

10 $\mathbf{P}(j \mid i) = \frac{n_{ji}}{\sum_k n_{ki}}$;

11 (f) for each pair of items i and j with $n_{ij} \neq 0$, computing

12
$$\mathbf{P}(\text{renewal} \mid j, i) = \frac{n_{ji}'}{n_{ji}} + \mathbf{P}(\text{renewal}) \left(1 - \frac{n_{ji}'}{n_{ji}} \right); \text{ and}$$

13 (g) for each pair of items i and j with $n_{ij} \neq 0$, computing

14
$$\mathbf{P}'(j \mid \text{asso}, i) = \mathbf{P}(j \mid i) \times \frac{(1 - \mathbf{P}(\text{renewal} \mid j, i))}{(1 - \mathbf{P}(\text{renewal} \mid i))}.$$

1 6. (canceled) The method of claim 5, wherein given a partial basket $\mathbf{B} = \{i_1,$
2 $i_2, \dots, i_k\}$ and $\bar{\mathbf{B}}$ is a complementary set of items not in \mathbf{B} , the step of
3 recommending ordering for a given partial market basket comprises the steps
4 of:

5 (a) if \mathbf{B} is empty, sorting items in order of decreasing $\mathbf{P}(j \mid \text{renewal})$ and
6 returning this as an item preference ordering;

7 (b) if \mathbf{B} is non-empty, then

8 (i) computing $\mathbf{P}(\text{renewal} \mid \mathbf{B}) = \min_{i_k \in \mathbf{B}} \mathbf{P}(\text{renewal} \mid i_k);$

9 (ii) compute a normalization factor $\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal});$

10 (iii) for each item $j \in \bar{\mathbf{B}}$, computing

11
$$\mathbf{P}(j \mid \text{renewal}) = \frac{\mathbf{P}'(j \mid \text{renewal})}{\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal})};$$

12 (iv) computing a normalization factor $\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(j \mid \text{asso}, \mathbf{B});$

13 (v) for each item $j \in \bar{\mathbf{B}}$, computing

14
$$\mathbf{P}'(j \mid \text{asso}, \mathbf{B}) = \max_{i_k \in \mathbf{B}} \mathbf{P}(j \mid \text{asso}, i_k);$$

- 15 (vi) for each item $j \in \bar{\mathbf{B}}$, computing
16
$$\mathbf{P}(j \mid \text{asso}, \mathbf{B}) = \frac{\mathbf{P}'(j \mid \text{asso}, \mathbf{B})}{\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{asso}, \mathbf{B})};$$

17 (vii) for each item $j \in \bar{\mathbf{B}}$, computing
18 $\mathbf{P}(j \mid \mathbf{B}) = \mathbf{P}(j \mid \text{asso}, \mathbf{B})\mathbf{P}(\text{asso} \mid \mathbf{B}) + \mathbf{P}(j \mid \text{renewal}, \mathbf{B})\mathbf{P}(\text{renewal} \mid \mathbf{B});$
19 and
20 (viii) sorting items in order of decreasing $\mathbf{P}(j \mid \mathbf{B})$ and returning this
21 as an item preference ordering.

1 7. (canceled) The method of claim 6, wherein the step of sorting comprises
2 the step of using a final probability obtained for each item, $\mathbf{P}(j \mid \mathbf{B})$, of a
3 customer buying the item to maximize profit by recommendation.

1 8. (canceled) The method of claim 7, wherein the step of using a final
2 probability of an item to maximize profit comprises the steps of:
3 assigning a profit amount, $\$j$, to each item;
4 computing $\mathbf{P}(j \mid \mathbf{B})\j for each item; and
5 ranking recommendations based on the computation of $\mathbf{P}(j \mid \mathbf{B})\j for
6 each item.

1 9. (new) A method for making prioritized recommendations to a customer in
2 the process of filling a market basket for purchase on an Internet commerce
3 site, the method comprising the steps of:
4 collecting statistics on preferences for associative and renewal buying
5 from training data;
6 precomputing model parameters from the collected statistics; and
7 recommending ordering for a given partial market basket based on the
8 precomputed model parameters.

1 10. (new) The method of claim 9, wherein the step of collecting statistics
2 comprises the steps of:

- 3 (a) for each item j , obtaining n_j a number of baskets with item j purchased;
4 (b) for each item j , obtaining n_j' a number of baskets with j being a sole
5 item purchased;
6 (c) for each pair of items i and j , obtaining a number of market baskets n_{ji}
7 with items j and i purchased together; and
8 (d) for each pair of items i and j , obtaining a number of market baskets
9 n_{ji}' with items i and j being the only two items purchased.

1 11. (new) The method of claim 10, wherein the step of precomputing model
2 parameters comprises the steps of:

3 (a) computing $\mathbf{P}(\text{renewal}) = \frac{\sum_k n_k'}{\sum_k n_k}$;

4 (b) for each item j , computing $\mathbf{P}(j) = \frac{n_j}{\sum_k n_k}$;

5 (c) for each item j , computing $\mathbf{P}(\text{renewal} \mid j) = \frac{n_j'}{n_j} + \mathbf{P}(\text{renewal}) \left(1 - \frac{n_j'}{n_j} \right)$

6 ;

7 (d) for each item j , computing

8 $\mathbf{P}'(j \mid \text{renewal}) = \mathbf{P}(\text{renewal} \mid j) \times \frac{\mathbf{P}(j)}{\mathbf{P}(\text{renewal})}$;

9 (e) for each pair of items i and j with $n_{ij} \neq 0$, computing

10 $\mathbf{P}(j \mid i) = \frac{n_{ji}}{\sum_k n_{ki}}$;

11 (f) for each pair of items i and j with $n_{ij} \neq 0$, computing

12
$$\mathbf{P}(\text{renewal} \mid j, i) = \frac{n_{ji}'}{n_{ji}} + \mathbf{P}(\text{renewal}) \left(1 - \frac{n_{ji}'}{n_{ji}} \right); \text{ and}$$

13 (g) for each pair of items i and j with $n_{ij} \neq 0$, computing

14
$$\mathbf{P}'(j \mid \text{asso}, i) = \mathbf{P}(j \mid i) \times \frac{(1 - \mathbf{P}(\text{renewal} \mid j, i))}{(1 - \mathbf{P}(\text{renewal} \mid i))}.$$

1 12. (new) The method of claim 11, wherein given a partial basket $\mathbf{B} = \{i_1, i_2, \dots, i_k\}$ and $\bar{\mathbf{B}}$ is a complementary set of items not in \mathbf{B} , the step of
2 recommending ordering for a given partial market basket comprises the steps
3 of:
4

5 (a) if \mathbf{B} is empty, sorting items in order of decreasing $\mathbf{P}(j \mid \text{renewal})$ and
6 returning this as an item preference ordering;

7 (b) if \mathbf{B} is non-empty, then

8 (i) computing $\mathbf{P}(\text{renewal} \mid \mathbf{B}) = \min_{i_k \in \mathbf{B}} \mathbf{P}(\text{renewal} \mid i_k);$

9 (ii) compute a normalization factor $\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal});$

10 (iii) for each item $j \in \bar{\mathbf{B}}$, computing

11
$$\mathbf{P}(j \mid \text{renewal}) = \frac{\mathbf{P}'(j \mid \text{renewal})}{\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{renewal})};$$

12 (iv) computing a normalization factor $\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(j \mid \text{asso}, \mathbf{B});$

13 (v) for each item $j \in \bar{\mathbf{B}}$, computing

14
$$\mathbf{P}'(j \mid \text{asso}, \mathbf{B}) = \max_{i_k \in \mathbf{B}} \mathbf{P}(j \mid \text{asso}, i_k);$$

- 15 (vi) for each item $j \in \bar{\mathbf{B}}$, computing
16
$$\mathbf{P}(j \mid \text{asso}, \mathbf{B}) = \frac{\mathbf{P}'(j \mid \text{asso}, \mathbf{B})}{\sum_{k \in \bar{\mathbf{B}}} \mathbf{P}'(k \mid \text{asso}, \mathbf{B})};$$

17 (vii) for each item $j \in \bar{\mathbf{B}}$, computing
18 $\mathbf{P}(j \mid \mathbf{B}) = \mathbf{P}(j \mid \text{asso}, \mathbf{B})\mathbf{P}(\text{asso} \mid \mathbf{B}) + \mathbf{P}(j \mid \text{renewal}, \mathbf{B})\mathbf{P}(\text{renewal} \mid \mathbf{B});$
19 and
20 (viii) sorting items in order of decreasing $\mathbf{P}(j \mid \mathbf{B})$ and returning this
21 as an item preference ordering.

1 13. (new) The method of claim 12, wherein the step of sorting comprises the
2 step of using a final probability obtained for each item, $\mathbf{P}(j \mid \mathbf{B})$, of a customer
3 buying the item to maximize profit by recommendation.

1 14. (new) The method of claim 13, wherein the step of using a final
2 probability of an item to maximize profit comprises the steps of:
3 assigning a profit amount, $\$_j$, to each item;
4 computing $\mathbf{P}(j \mid \mathbf{B})\$_j$ for each item; and
5 ranking recommendations based on the computation of $\mathbf{P}(j \mid \mathbf{B})\$_j$ for
6 each item.